



بسم الله الرحمن الرحيم			
Specialization Course Name :	Engineering Engineering Thermodynamics		السلطة الوطنية الفلسطينية وزارة التربية والتعليم العالي MINISTRY OF EDUCATION & HIGHER EDUCATION جامعة فلسطين التقنية "خضوري" 
Date :	4-1-2011		Final Exam 2010-2011 1st semester 2010-2011
Time :	120 minutes		
Name : .....		Section : .....	

Q1: a- Define the following:

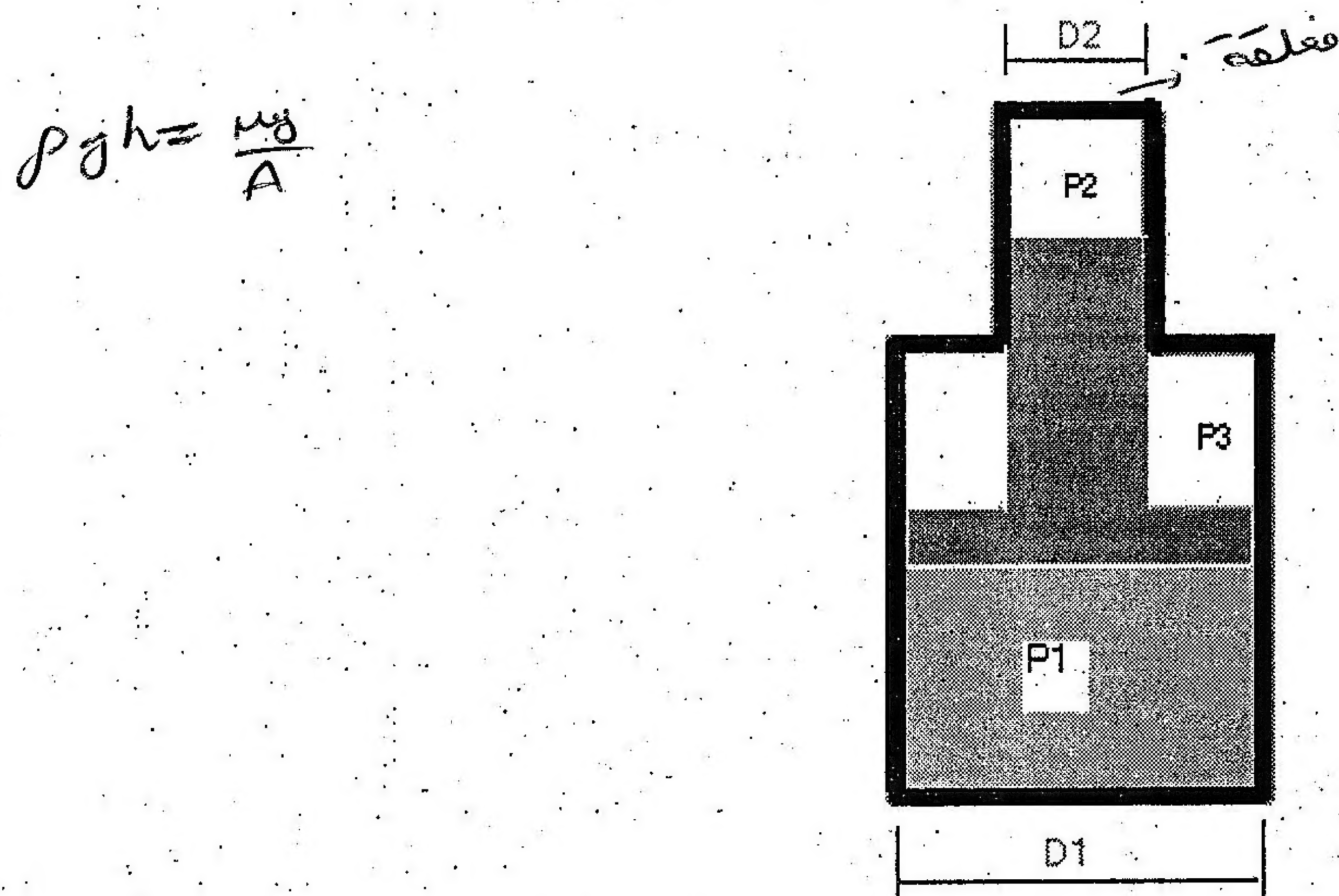
(4 marks)

Constant pressure specific heat, Isochoric processes, Ideal gas, Adiabatic process

b- For the cylinder shown,  $D_1 = 8$  cm,  $D_2 = 5$  cm,  $P_1 = 1050$  kPa,  $P_2 = 1400$  kPa.

Determine the pressure in chamber 3.

(6 marks)



ديناميكا حرارية  
سأني

تم الرفع بواسطة  
م. معن أبو عيسى

Q2 : a- What are the difference between point and path functions, give one example on each.

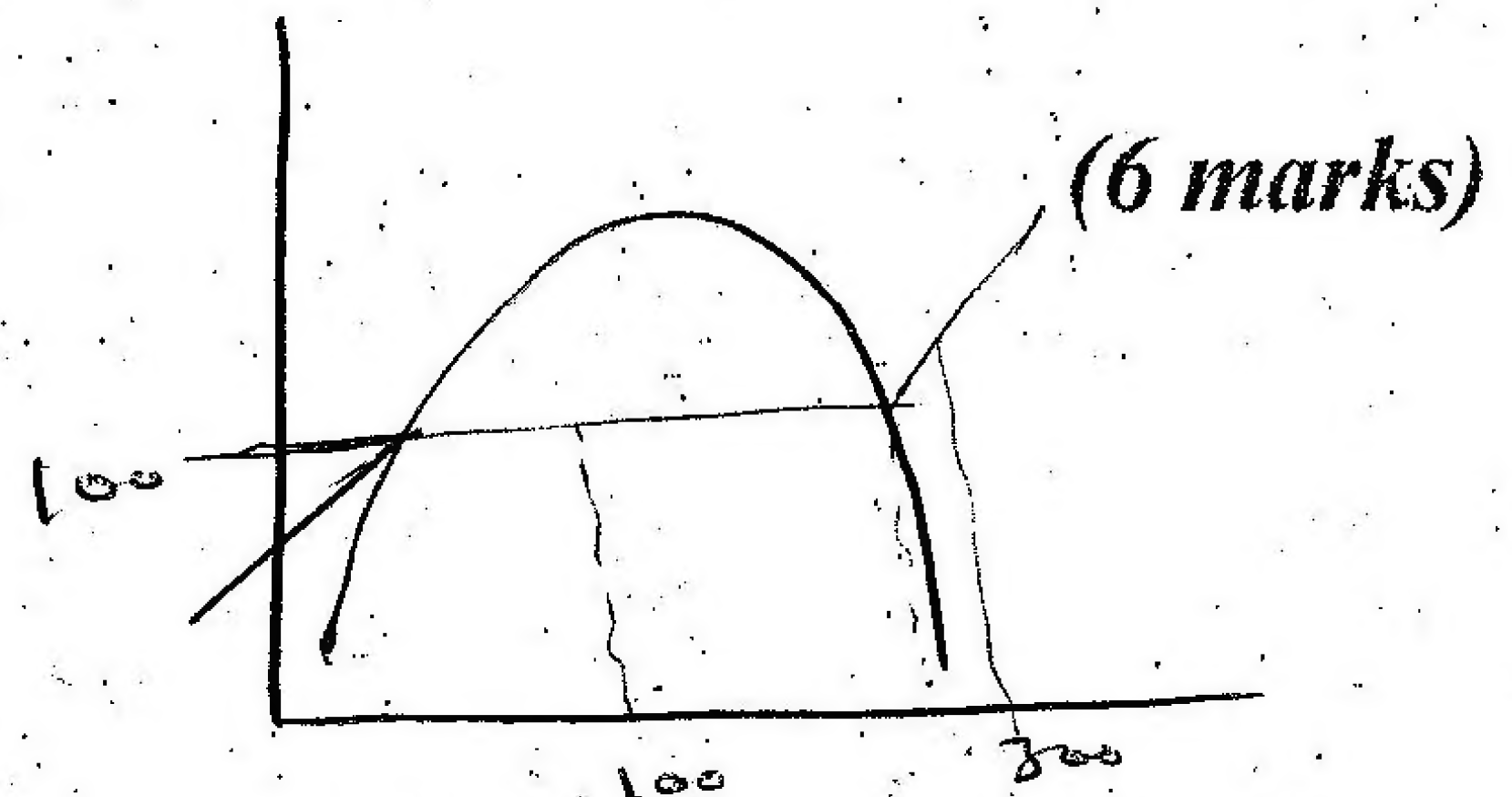
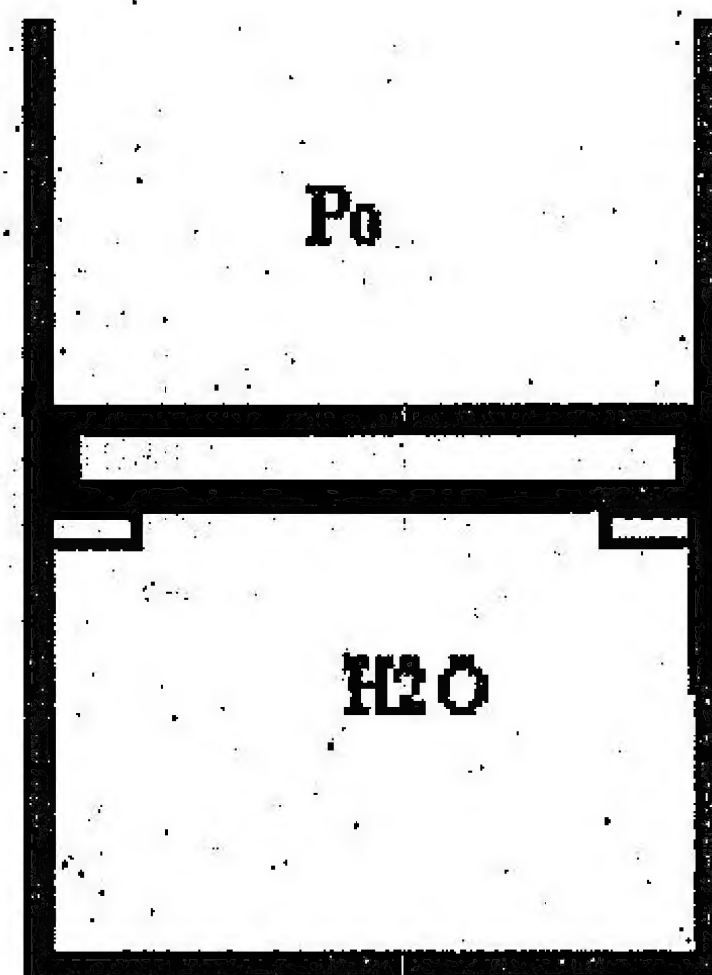
(4 marks)

b- A gas initially at 1 MPa, 500 C<sup>0</sup> is contained in a piston and cylinder arrangement with an initial volume of 0.1 m<sup>3</sup>. The gas is then slowly expanded according to the relation  $PV = \text{constant}$  until a final pressure of 100 kPa is reached. Determine the work for this process

(6 marks)

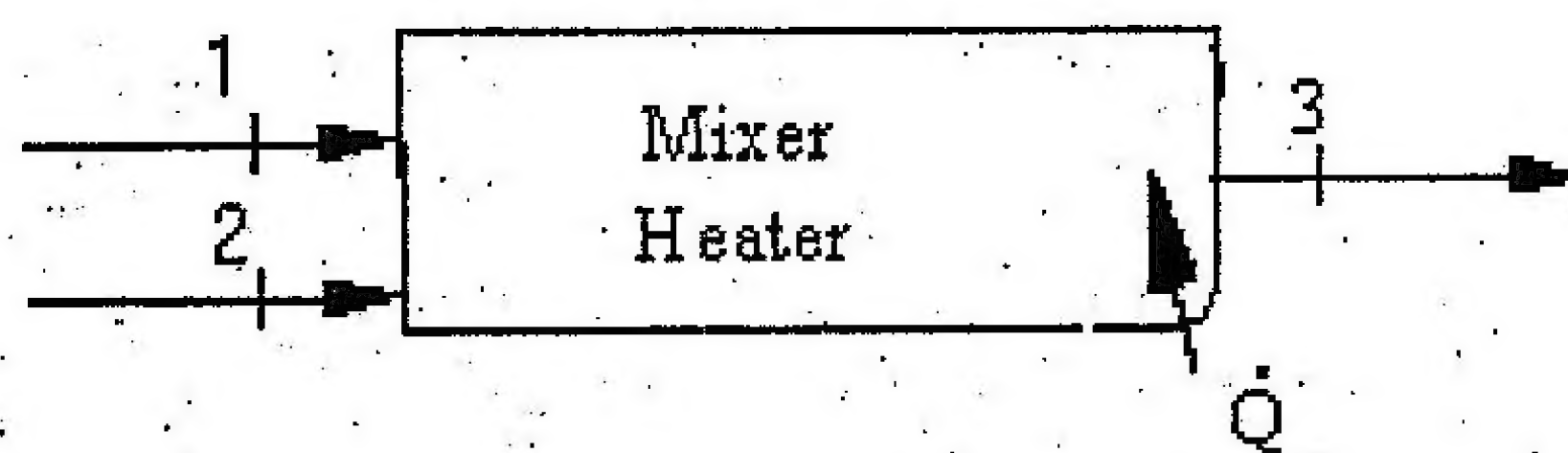


**Q3: a-** A piston cylinder setup contains 0.1 kg saturated mixture water at 100 kPa with quality 25%. The mass of the piston and atmospheric pressure is such that a pressure of 500 kPa will float it. The water is heated to  $300^\circ\text{C}$ . Find the final pressure, volume and the work.



**b-** Compressed liquid R-22 at 1.5 MPa,  $10^\circ\text{C}$  is mixed in a steady-state, steady-flow process with saturated vapor R-22 at 1.5 MPa. Both flow rates are 0.1 kg/s, and the exiting flow is at 1.2 MPa and a quality of 85%. Find the rate of heat transfer to the mixing chamber.

(6 marks)



**Q4-** A 250-L rigid tank contains methane gas at  $500^\circ\text{C}$ , 600 kPa. The tank is cooled to  $300^\circ\text{K}$ , assuming ideal gas

- Find the final pressure
- The heat transfer for the process. Using expression for  $C_p$  from tables
- What is the percent error in the heat transfer if the specific heat is assumed constant at the room temperature value?

(8 marks)

Good Luck